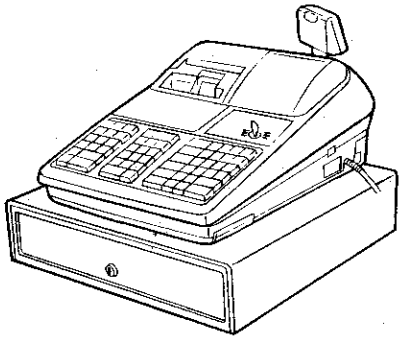
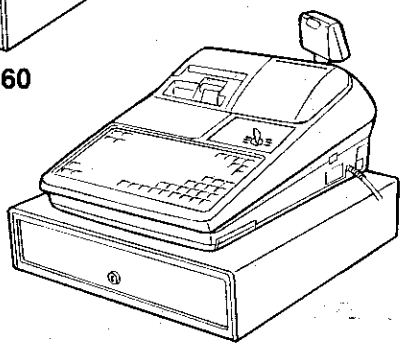
SHARP INSTALLATION MANUAL

CODE: 00ZERA460VIME



ER-A460



ER-A470

ELECTRONIC CASH REGISTER

ER-A460
MODEL ER-A470

SRV Key : LKGIM7113RCZZ
PRINTER : DP-730
(For "V" version)

CAUTION
EXTREME CAUTION MUST BE TAKEN WHEN SERVICING THIS MACHINE. EVEN THOUGH THE MODE SWITCH IS IN THE OFF POSITION, VOLTAGE IS STILL SUPPLIED TO THE ENTIRE MACHINE.
WHEN WORKING ON THIS MACHINE MAKE SURE THAT THE POWER CORD IS REMOVED FROM THE WALL OUTLET.

CONTENTS

CHAPTER 1. GENERAL 1
CHAPTER 2. LIST OF OPTIONS 2
CHAPTER 3. REMOVING THE TOP CABINET 3
CHAPTER 4. REMOVING THE LOWER CABINET 4
CHAPTER 5. EXPANSION RAM CHIP and CONTROL ROM (ER-01RA, ER-02RA) 5
CHAPTER 6. RS232 I/F (ER-A5RS) 7
CHAPTER 7. REMOTE DRAWER (CBOXD7136BH01) 9
CHAPTER 8. DRAWER FIXING KIT (DIT-8633RCZZ) 11
CHAPTER 9. ONE HOLE CLERK KEY (ER-A5CL) 12
CHAPTER 10. JOURNAL NEAR END SENSOR (DUNT-4945BHZZ) 13
CHAPTER 11. KEY TOP KIT (For ER-A460 only: ER-11KT7/12KT7/22KT7/11DK7/51DK7) 14

Parts marked with "⚠" is important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

SHARP CORPORATION

This document has been published to be used for after sales service only.
The contents are subject to change without notice.

CHAPTER 1. GENERAL

This manual describes the installation and operational test procedures for the Model ER-A460/A470 system ECR options.
Be sure to read the "BEFORE INSTALLING OPTIONS" prior to installing any option.
Descriptions of the specifications of the ECR and options subject to change.

Note: This manual describes only options whose installing procedures need to be explained.

* BERORE INSTALLING OPTIONS

1. If you install any options in an ER-A460/A470 register already in use, you must reset the totals. Please notify its user before performing the installation.
   If the register is not reset, sales data stored in the register may be destroyed due to possible incorrect installation.
2. Print out the SRV-mode and PGM2-mode programs before installing any option. It may be necessary to modify each program after installation. These printouts are needed for this modification.
3. If you install the option PWBs (ER-A5RS), option control ROM (ER-A46R1) and expansion RAM chip in the ER-A460/A470 register already in use, perform data saving for memory protection by using the IR interface in advance.
4. As a safety measure, be sure to turn the mode switch to the OFF position and unplug the register before installing any option.
5. The ER-A460/A470 is equipped with various SRV-mode functions to aid you in installing the options. Never enter any job numbers other than those shown in each of the following sections, so that data stored is not destroyed.
6. After installing any options, start the ER-A460/A470 register by performing the service reset or the master reset.

   Service reset
   1) Turn the mode switch to the SRV' position to turn on the power.
   2) Turn the mode switch to the SRV position.

Sample printout
PRG. RESET ***

   Master reset
   1) Turn the mode switch to the SRV' position to turn on the power.
   2) Turn the mode switch to the SRV position, holding down the journal feed key.

Sample printout
MASTER. RESET ***

CHAPTER 2. LIST OF OPTIONS

1. Options

NO	NAME	MODEL	DESCRIPTION
1	ONE HOLE CASHIER KEY	ER-A5CL	
2	EXPANSION RAM CHIP	ER-01RA	32K bytes RAM chip
		ER-02RA	128K bytes RAM chip
3	ON-LINE SYSTEM	ER-A5RS	2ports RS-232 I/F
4	CONTROL ROM	ER-A46R1	Control for ER-A5RS
5	PRESETS LOADER	ER-01FD/02FD	FD unit
6	KEY TOP KIT (For ER-A460)	ER-11KT7	1 × 1 key top
		ER-12KT7	1 × 2 key top
		ER-22KT7	2 × 2 key top
		ER-11DK7	1 × 1 dummy key
		ER-51DK7	5 × 1 dummy key
7	TEXT PRESET KEYBOARD	ER-01RK	IR I/F text preset keyboard
8	WIRELESS INTERFACE	CE-iR2/iR4	For IR communication
9	COIN CASE	ER-48CC2	
10	COIN CASE COVER	ER-01CV1~CV5	

2. Service options

NO.	NAME	PARTS CODE	PRICE RANK	DESCRIPTION	ER-A460	ER-A470
1	SERVICE KEY	LKGiM7113RCZZ	AK	For the mode switch	O	O
2	DRIP-PROOF SWITCH COVER	GCÖVB7108BHZZ	BA		O	O
3	MODE KEY GRIP COVER	LKGiM7126RCZZ	AL	OP key only	O	O
4	DRIP-PROOF KEYBOARD COVER	GCÖVB7109BHZZ	BF		O	×
5	JOURNAL NEAR END SENSOR	DUNT-4945BHZZ	AY		O	O
6	PROGRAMMING CHARACTER KEYBOARD COVER	GCÖVB7110BHZA	BE		O	×
7	REMOTE DRAWER	CBÖXD7136BH01	BU		O	O
8*	CLERK COVER "B"	GCÖVA7107BHZB	AG	For ER-A5CL	O	O
	CLERK ANGLE	LANGT7581BHZZ	AM		O	O
	SCREW	XUSSD26P08000	AA		O	O

* From 1995 September production, part No.8 is packed together with ER-A5CL.

3. Service tools

NO.	NAME	PARTS CODE	PRICE RANK
1	EXPANSION PWB	CKÖG-6708RCZZ	BU
2	RS-232 LOOP BACK CONNECTOR FOR ER-A5RS	UKÖG-6705RCZZ	BU
3	KEY TOP REMOVER	UKÖG-6634RCZZ	AX

4. Supplies

NO.	NAME	PARTS CODE	PRICE RANK	DESCRIPTION
1	ROLL PAPER	DPAPR1006CSZZ	AR	5rolls/pack
2	INK RIBBON	PRBN-6644RCZZ	AZ	
3	INK FOR STAMP	UiNK-1001CCZZ	AK	5 cc
4	KEY SHEET (For ER-A470)	PSHEK6830BHZZ	AU	Programming character sheet
		PSHEK6829BHZZ	AR	Standard character sheet
		PSHEK6828BHZZ	AK	Blank character sheet

CHAPTER 3. REMOVING THE TOP CABINET

1. Removing the top cabinet

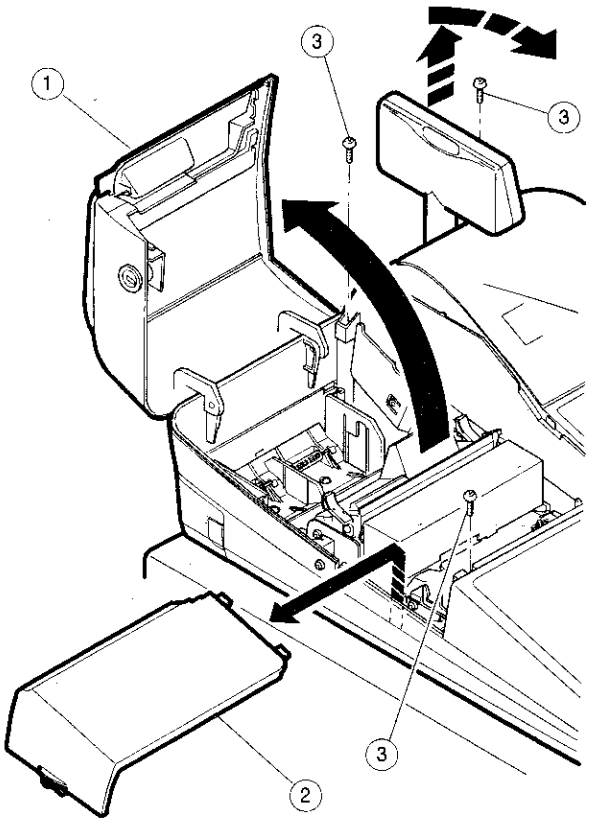


Fig. 1

1) Open the printer cover ①.
2) Remove the ribbon cover ②.
   Lift the left end of the ribbon cover and slide it to the left.
3) Lift the pop-up display and rotate as illustrated above.
4) Remove the three screws ③ suited on the lower cabinet.
5) Slightly lift and slide the top cabinet, and remove grounding wire ④. Grounding wire ④ is connected between the keyboard and the drawer. When disconnecting the grounding wire, disconnect either the drawer side or the keyboard side of the grounding wire.

   Note: Do not pull up the top cabinet until the grounding wire and the connector cables from the top cabinet are removed.

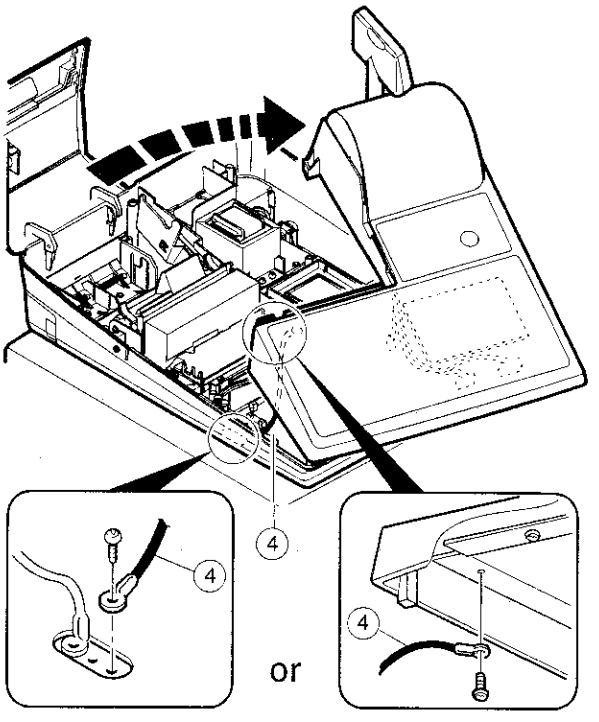


Fig. 2

6) Remove connector cables ⑤, ⑥ and ⑦ from the top cabinet.

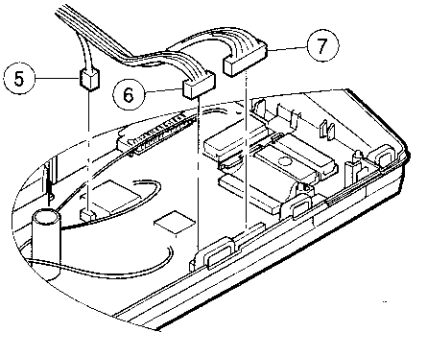


Fig. 3

7) Remove the top cabinet from the lower cabinet.

2. Replacing the top cabinet

Install the top cabinet in the reverse order of removing. Before installing, make sure that each connector is connected securely and that the grounding wire is secured.

CHAPTER 4. REMOVING THE LOWER CABINET

1. Removing the lower cabinet.

1) Open the printer cover.

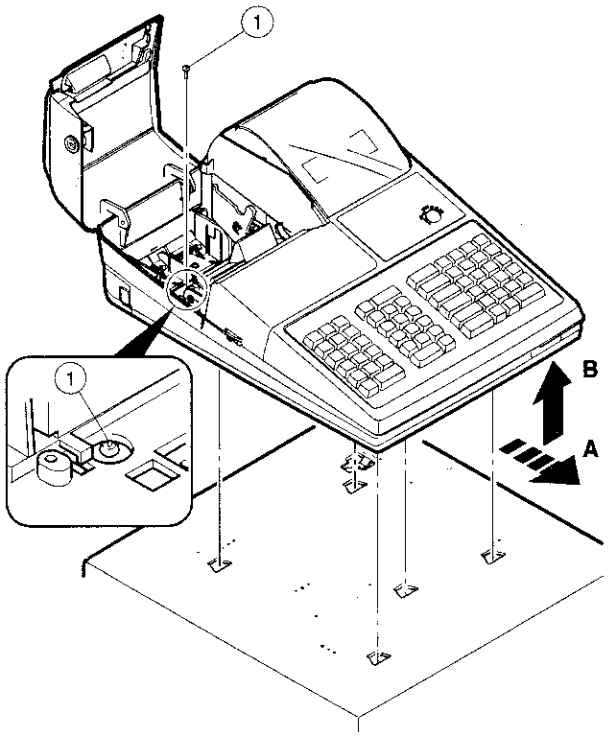


Fig. 1

2) Remove the fixing screw ① of the lower cabinet.

3) Slide the main unit in the direction of the arrow A and lift it in the direction of the arrow B.

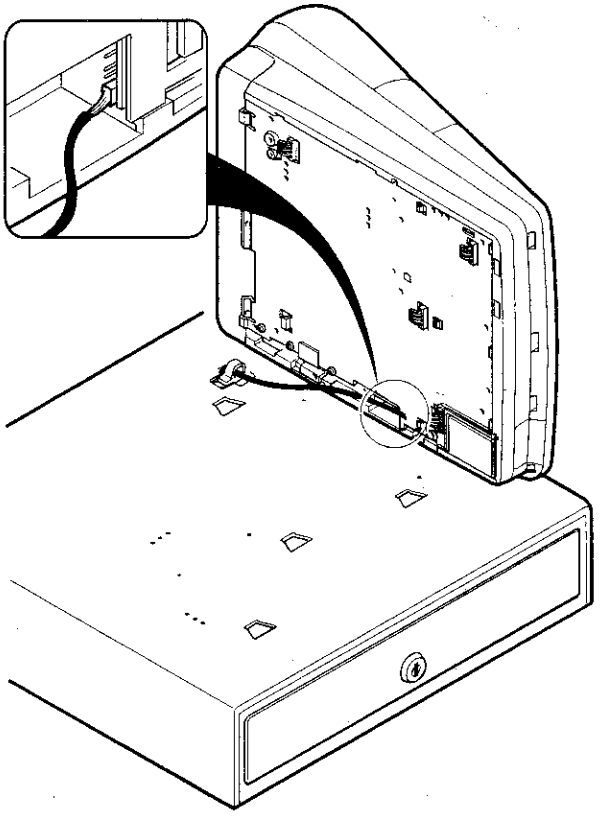


Fig. 2

4) Stand the main drawer sideways as illustrated above, and disconnect the drawer connector.

2. Replacing the main drawer

Install the main drawer in the reverse order of removing. Before installing, make sure that the connector is securely fastened.

CHAPTER 5. EXPANSION RAM CHIP (ER-01RA, ER-02RA) AND CONTROL ROM (ER-A46R1)

1. Outline

The following expansion RAM chips are available for the ER-A460/A470.

ER-01RA: 32KB SRAM chip

ER-02RA: 128KB SRAM chip

The ER-A46R1 is the control ROM used for the following options of the ER-A460/A470.
The control ROM (ER-A46R1) must be installed when any of the following options is used.

ER-A5RS: RS232 I/F

2. Installation procedure

Before working on the installation, turn off the power switch on the ECR and unplug the AC cord from the AC outlet.
Also save the memory contents via the serial interface before proceeding to the installation work.

① ER-01RA and ER-02RA

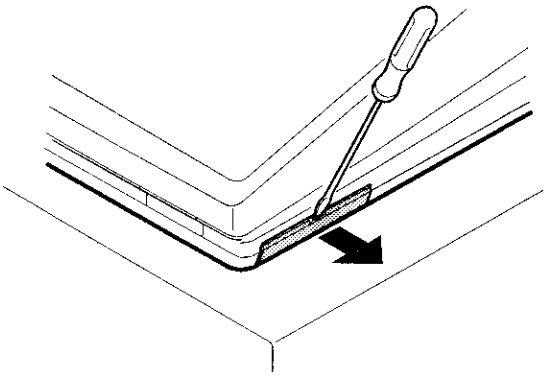


Fig. 1

1) Insert a screwdriver into the slit on the right side of the lower cabinet to remove the option ROM/RAM case.

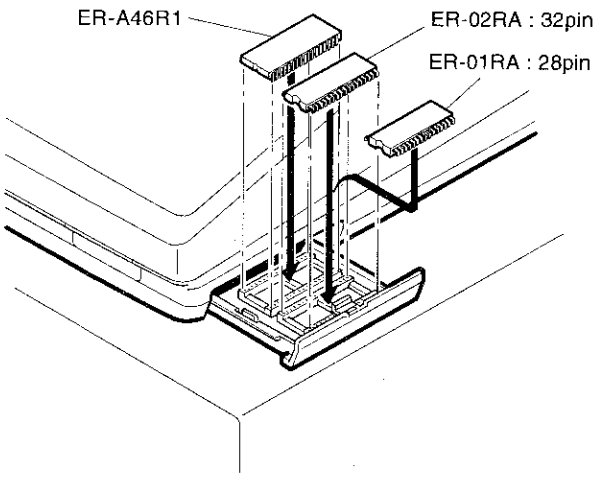


Fig. 2

2) Expansion RAM chip (ER-01RA, ER-02RA)
   ① Install to the IC socket on the option ROM/RAM PWB. (Location No. RAM2)

   Note: The number of pins are different between the ER-01RA (28 pins) and the ER-02RA (32 pins). Observe the correct position for insertion of the chip. (Fig.1, 2)

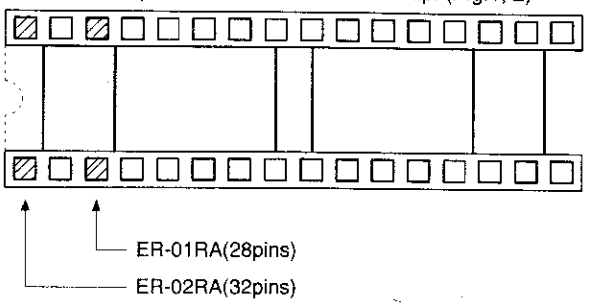


Fig. 3

3) Control ROM (ER-A46R1)
   ① Install to the IC socket on the option ROM/RAM PWB. (Location No. ROM2)
4) Master reset the ECR.
5) Load the data in memory which had been saved.
6) Program reset the ECR.

3. Operation test

1) Option RAM test

① Key operation
200 → TL

JOB #NO.	RAM NO.	Memory to be checked	Address area to be checked
200	Option RAM (main)	ER-02RA	1E0000H ~ 1FFFFFH
		ER-01RA	1E0000H ~ 1E4FFFH

② Content
The following check are performed for the optional RAM.
The following process is performed for memory addresses to be checked.

PASS1: memory data save
PASS2: Data "00H" write
PASS3: Data "00H" read and comparison, data "55H" write
PASS4: Data "55H" read and comparison, data "AAH" write
PASS5: Data "AAH" read and comparison
PASS6: Memory data restore

If a compare error is found in the check sequence from PASS1 to PASS6, error print (error code E1) is performed. If there is no error found to the end of the last address, the operation is completed normally.

Address to be checked
1E0000H, 1E0001H
1E0002H, 1E0004H
1E0008H, 1E0010H
1E0020H, 1E0040H
1E0080H, 1E0100H
1E0200H, 1E0400H
1E0800H, 1E1000H
1E2000H, 1E4000H
1E8000H, 1F0000H → (For ER-02RA)

DOT DISPLAY: O – R A M T S S R V

7-SEGMENT DISPLAY:

③ Check the following items.
Check the termination print.

④ Test termination
The test terminates after printing the termination printout.

Termination print

E01---01RA	200	(ER-01RA data check error)
E02---01RA	200	(ER-01RA address check error)
E01---02RA	200	(ER-02RA data check error)
E02---02RA	200	(ER-02RA address check error)
01RA	200	(ER-01RA normal end)
02RA	200	(ER-02RA normal end)

2) Option ROM test

① Key operation:
400 → TL

② Functional description:
A sum check is done for the option ROM (Address hex C80000H thru C9FFFFH.)

DOT DISPLAY: O – R O M T S S R V

7-SEGMENT DISPLAY:

③ Check the following items:
Check the termination printout.

④ Test termination:
The test terminates after printing the termination printout.
Termination printout

Normal termination

	400
ROM	27010※※※※※
	※※※※※
E – – – – –	400
ROM	27010※※※※※
	※※※※※

※※※※※: ROM version No.

	400
ROM	27010RAO1A
	RAO1A

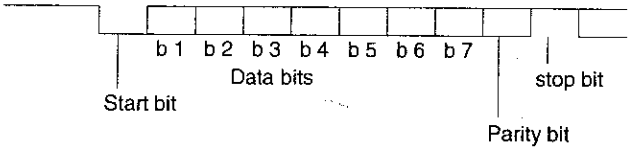
CHAPTER 6. RS232 I/F (ER-A5RS)

1. Outline

The ER-A5RS are interface PWB options for the ER-A460/A470. The control ROM (ER-A46R1) must be installed in order to use this PWB options.
Refer to the programming manual for system setup and configure the correct setting appropriate to the devices selected.

ER-A5RS

1) Online interface
   a) Interface : RS232
   b) Duplex type : Half-duplex/Full-duplex
   c) Line configuration : Direct connection/Modem connection
   d) Data rate : 9600, 4800, 2400, 1200, 600 and 300 bps (Programmable)
   e) Synchronizing mode : Asynchronous
   f) Parity check : Vertical parity check (odd)
   g) Code : ASCII
   h) Bit sequence : LSB first
   i) Data format : 1 start bit + 7 dat bits + 1 parity + 1 stop bit



   j) Protocol : Polling/selecting (Simple procedure)
   k) Transmission line:
      Cable: Shielded cable
      Connector: D-sub 9 pin (female type) connector
      (ECR side) Inch pitch (4-40 UNC) lock screw
      Connector cover: Shielded cover

2. Components list

ER-A5RS

NO	NAME	PARTS CODE	Q'ty
1	PWB UNIT	CPWBS7292RC01	1
2	BRACKET	LANGT7466RCSA	1
3	SCREW (FOR PWB AND BRACKET)	LX-BZ6665RCZZ	2
4	SCREW (FOR HOLDING OF THE PWB BRACKET, AND BRACKET TO BRACKET)	LX-BZ6774RCZZ	3
5	SCREW (FOR HOLDING OF THE RS232 CABLE CORE)	XHBSD30P08000	2
6	WIRE TIE	LBNDJ2004SCZZ	1
7	CLAMP (FOR RS232 CABLE)	LHLDW6814RCZZ	2
8	SPACER	PSPAN7039XCZZ	1
9	FERRITE CORE (FOR EXTERNAL CABLE)	RCORF6658RCZZ	2
10	FERRITE CORE (FOR EXTERNAL CABLE)	RCORF6666RCZZ	2

* The ER-A460/A470 does not use No.8 = SPACER and No.9 = FERRITE CORE.

3. Installation procedure

1) Connect the internal cable to the interface PWB unit.
RS232 cable

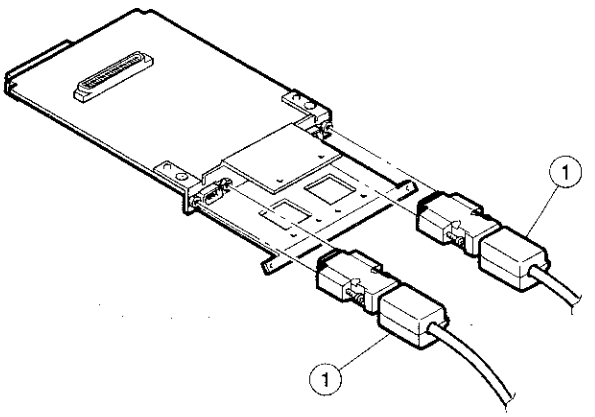


Fig. 1

- Be sure to install the core ① (RCORF6666RCZZ) on RS-232C cable.

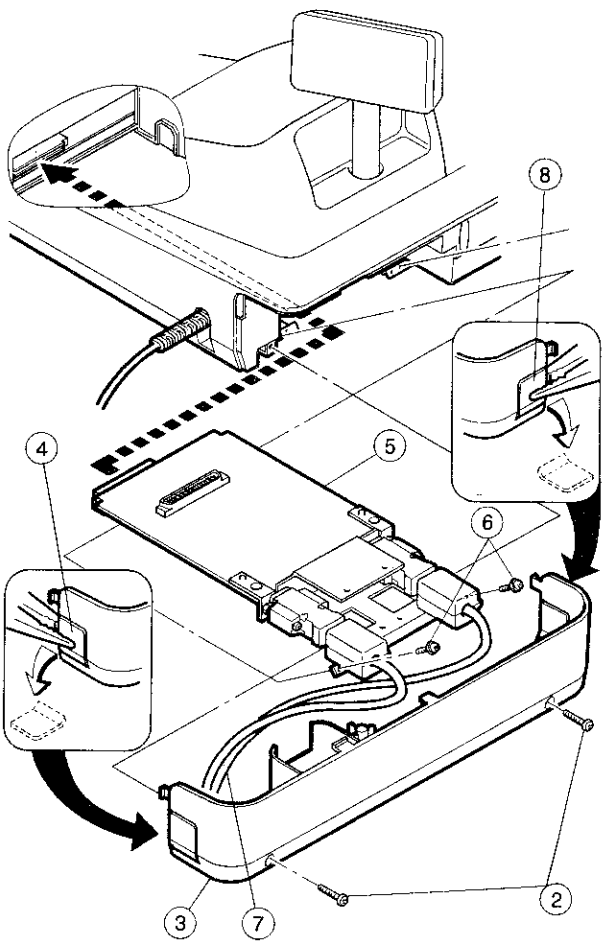


Fig. 2

2) Remove two rear cover holding screws ② and remove the rear cover ③.

   * The interface PWB needs to be inserted into the left side slot as seen from rear.

   * Tilt up the popup dispalay when removing the rear cover.

3) Break open the knockout ④ or ⑧ of the rear cover ③. After beraking open the knockout ④, file off the new hole.

4) Insert the interface PWB ⑤ onto the connector of the main PWB, and fasten the bracket to the chassis using screws ⑥ (LX-BZ6774RCZZ: Self tap screw).

   * Insert both sides of the interface PWB along the guides of the bottom cabinet.

5) Route the external cable ⑦ through the hole and fasten the rear cover (Fig.5)

4. External cable routing

In the ER-A460/A470, option cables can be pulled out from left side or right side points in the rear cover of the body. Refer to Fig.3.

1) The picture below shows how to pull out the cables from the left side.

<Left side>

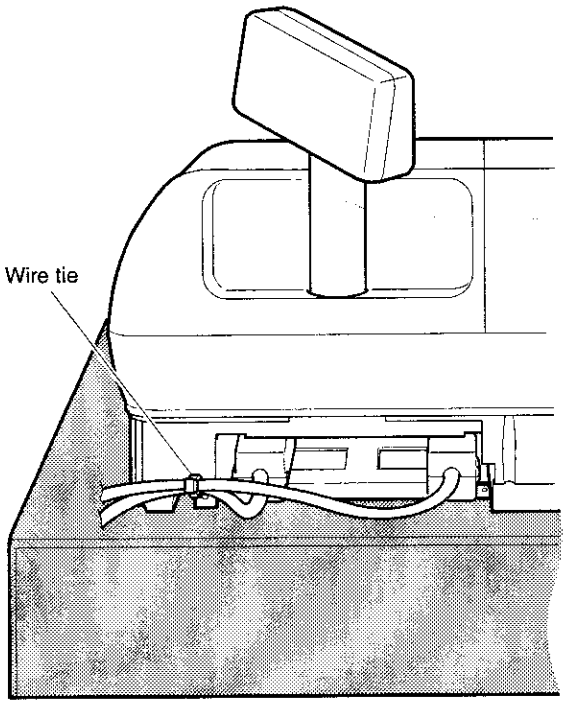


Fig. 3

<Right side>

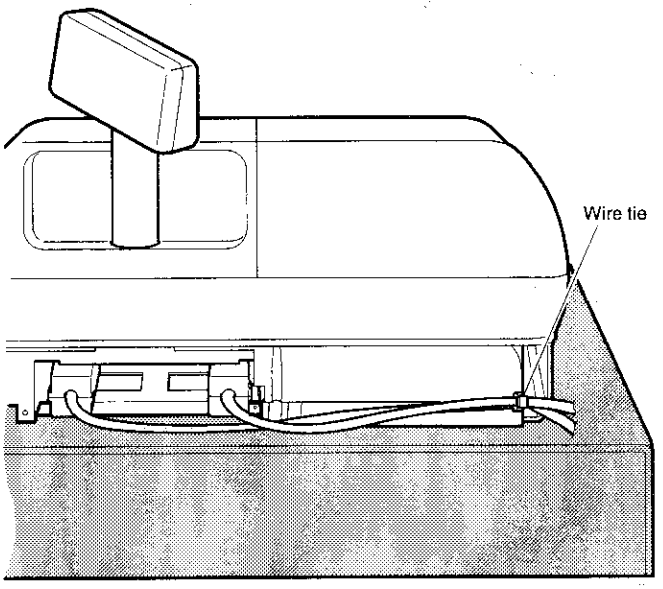


Fig. 4

5. Operation test

Please, refer to service manual. (CODE:00ZERA46VOSME)

CHAPTER 7. REMOTE DRAWER (CBOXD7136BH01)

CAUTION:
The drawer unit should be securely fitted to the supporting platform to avoid instability when the drawer is open.

1. Outline

The ER-A460/A470 allows connection of one remote drawer.

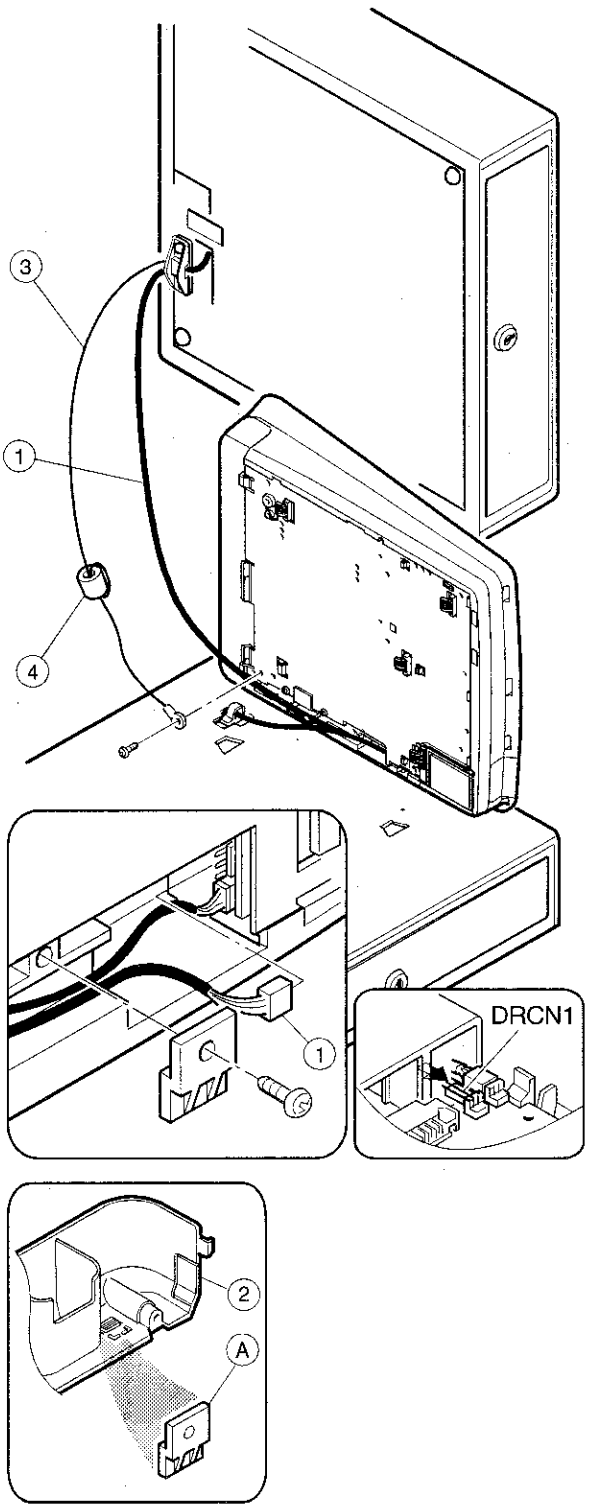
- Drawer connectors

  The main PWB is equipped with two drawer connectors (DRCN1, DRCN2) as standard provision.

  DRCN2: For a standard drawer
  DRCN1: For the remote drawer

2. Installation procedure

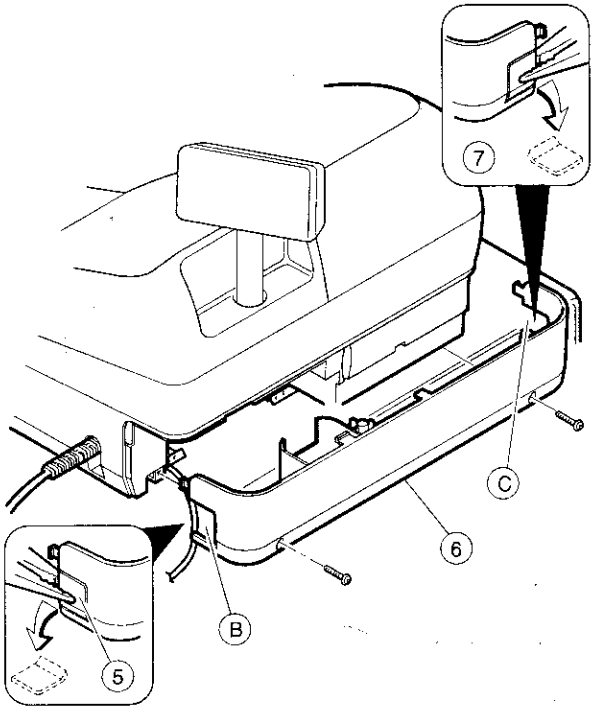
1) Remove the top cabinet.
2) Remove the rear cover.
3) Remove the lower cabinet.



4) Connect the remote drawer cable ① to the drawer connector DRCN1 of the main PWB.
5) Pass the remote drawer cable ① along the groove in the back surface of the lower cabinet.
6) Remove the split Ⓐ of the rear cover ② and fix the drawer cable to the lower cabinet.

7) Attach grounding wire ③ to the shield plate.
Use the screw which is fixing the shield plate to fix grounding wire ③ together.

8) Attach and fix grounding wire ③ to the shield plate.



9) Break open the knockout ⑤ of the rear cover ⑥ using the tool.
After breaking open the knockout ⑤ or ⑦, file off the sides of the new hole.

10) Route the Remote drawer cable 1 through the hole (Ⓑ or Ⓒ) and fasten the rear cover.

3. Drawer open sensor test

① Key operation
110~111 → TL

② Function description
The drawer indicated by the job number is opened to check the proper action.
Drawer opened: O indicated
Drawer closed: C indicated
110: Drawer-1: Standard drawer
111: Drawer-2: Remote drawer

DOT DISPLAY: D R A WE R Y S R V
7-SEGMENT DISPLAY: X

X: O= Drawer opened
C= Drawer closed
Y: 1 or 2

③ Check the following items:
a) Check opening of the specified drawer.
b) Check the display indication when the drawer is open and close.

④ Any key depression terminates the test with the termination print.

11 X Test termination print	X: 0~1

CHAPTER 8. DRAWER FIXING KIT (DKIT-8633RCZZ)

The drawer fixing kit is used for securing the cash drawer when installing separately from the ECR main unit or remote drawer.
By using two of brackets, the drawer box can be protected from drifting especially when it is filled with coins.

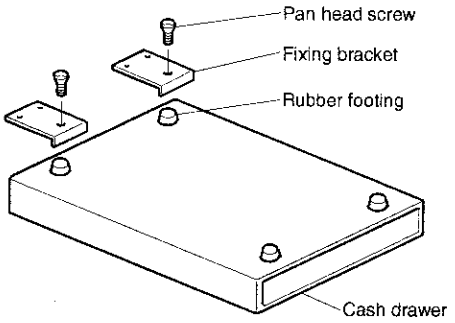
1. Parts list

KIT CODE: DKIT-8633RCZZ

No.	Parts code	Description	Q'ty
1	LBRC-2321RCZZ	Fixing bracket	2
2	XTPSD40P16000	Tapping screw M4x16	4
3	XBSSD40P16000	Flat head screw M4x16 (For remote drawer)	2
4	XUSSD40P20000	Flat head screw M4x20 (For standard drawer)	2
5	XBPSD40P22000	Screw M4x22	4
6	XNESD40-32000	NUT M4x32	4

2. Installation procedure

1) Turn over the drawer bottom side and remove rubber footing at two to locations.
2) Fasten the bracket together with the rubber footing using the pand hand screw.
   Pay attention for the installing direction of the bracket that the pan head screw can be inserted properly into the bracket.



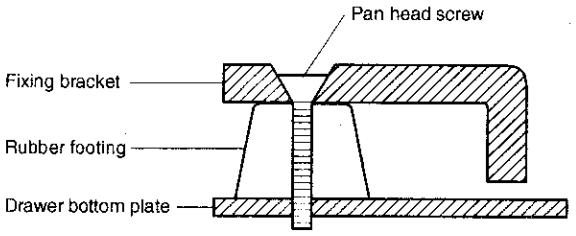


Fig. 1

3) Fastening on the table:
   Secure the fixing Bracket using the screw (Fig. 2).
   If the thickness of the table is less than 15mm, bore a 4.5mm hole in the table and fasten it with the screw (XBPSD40P22000 - 4pcs.) and nut (XNESD40-32000 - 4pcs.).

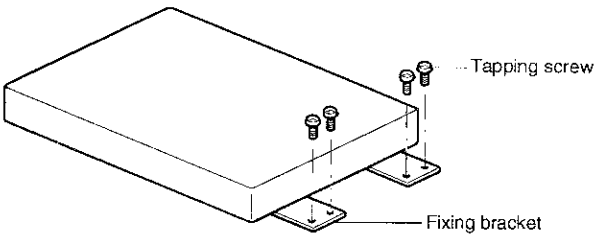


Fig. 2

CHAPTER 9. ONE HOLE CLERK KEY (ER-A5CL)

1. Components list

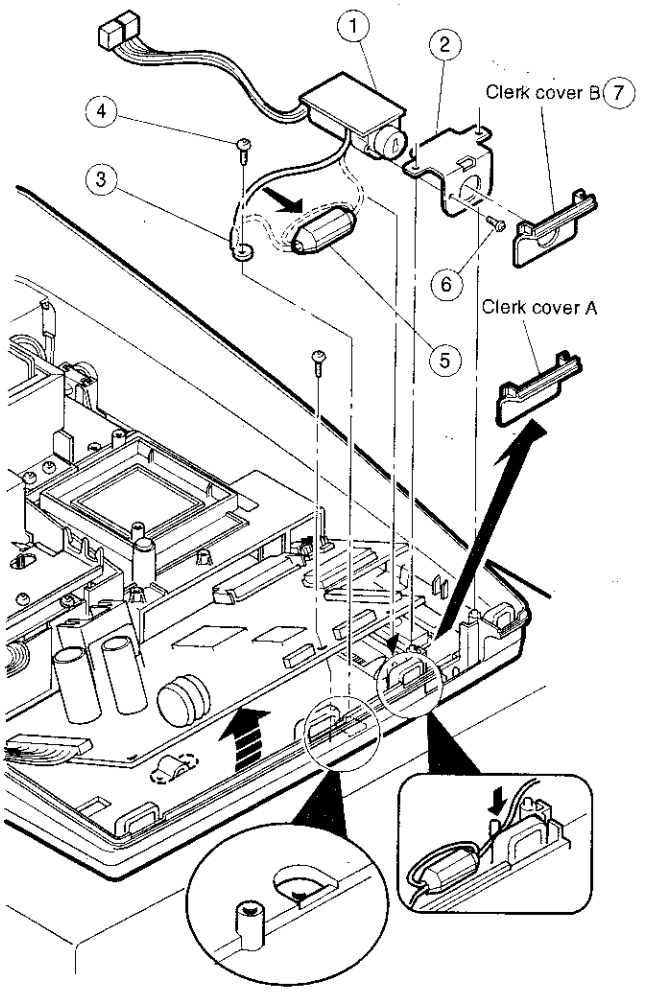
NO.	PARTS CODE	DESCRIPTION	Q'TY
1	LKGiW7339RCZZ	Clerk key body	1
2	LKGiM7340RCZZ	Clerk key 1	1
3	LKGiM7341RCZZ	Clerk key 2	1
4	LKGiM7342RCZZ	Clerk key 3	1
5	LKGiM7343RCZZ	Clerk key 4	1
6	LKGiM7344RCZZ	Clerk key 5	1
7	LKGiM7345RCZZ	Clerk key 6	1
8	QCNW-7062RCZZ	Cable 3P	1
9	QCNW-7063RCZZ	Cable 2P	1
10	QCNW-7593RCZZ	Earth wire	1
11	LBNDJ0013FCZZ	Band	2
12	HDECB6828RCZZ	Clerk panel	1
13	LHLDW2341RCZZ	Holder	2
14	LX-BZ6774RCZZ	Screw	1
15	RCORF6661RCZZ	Core	1
16	GCOVA7107BHZB	Clerk cover B	1
17	LANGT7581BHZZ	Clerk angle	1
18	XUSSD26P08000	Screw	1

* The ER-A460/A470 does not use No.11 = Band No.12 = Clerk panel and No.13 = Holder.

* From 1995 September production, No.16 ~ 18 are packed together with the ER-A5CL.

2. Installation procedure

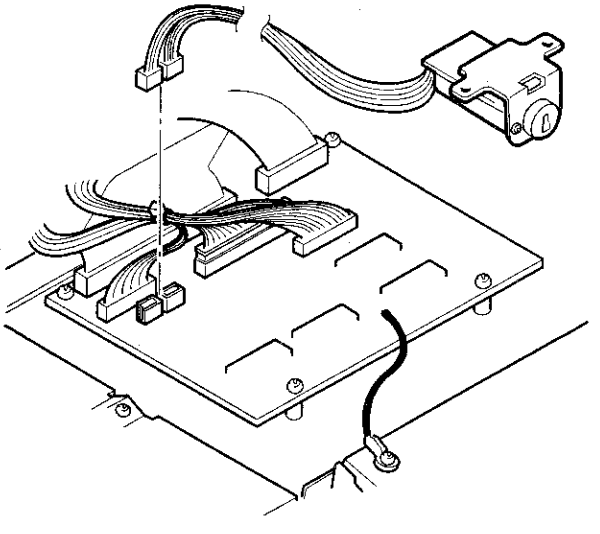
1) Remove the top cabinet.
2) Remove the main PWB.
3) Remove the clerk cover A.
4) Attach clerk angle ② to clerk key body ① and fix with screw ⑥ (XUSSD26P08000).
5) Install the key switch body ① to the clerk cover B ⑦ then install it the bottom cabinet.
6) Fix the earth wire ③ with the main chassis, using the screw ④ (LX-BZ6774RCZZ)
7) Attach the core ⑤ to the earth wire ③.



Note: 1. When the ER-A5RS is used, the main PWB must be removed. Remove the ER-A5RS before work.

8) Install the clerk key connector cables ⑥ (CN1, CN8)

* Connect with the connector of the same color.



3. Operation test

1) Key, clerk, and switch position code display

① Key operation
101 → TL

DOT DISPLAY: C L K / K E Y S R V
7-SEGMENT DISPLAY: ○○○ — — ○○○ — —
Person-in-charge code
Key position code

② Functional description
Key, clerk, and receipt switch codes are displayed.

③ Check the following items:
Change key and switch positions for proper display activation.
Clerk code: 1 hole clerk key
000 (off state)
001 (Clerk 1)
002 (Clerk 2)
≀
255 (Clerk 255)
Key code: --- (simultaneous two key) depression, invalid entry)

KEY POSITION CODE
ER-A460 (Normal key) 14 x 6

↑R	↑J	016	022	028	034	040	046	052	058	064	070	076	082
005	010	015	021	027	033	039	045	051	057	063	069	075	081
004	009	014	020	026	032	038	044	050	056	062	068	074	080
003	008	013	019	025	031	037	043	049	055	061	067	073	079
002	007	012	018	024	030	036	042	048	054	060	066	072	078
001	006	011	017	023	029	035	041	047	053	059	065	071	077

ER-A470 (Flat key) 15 x 8

↑R	↑J	022	030	038	046	054	062	070	078	086	094	102	110	118
007	014	021	029	037	045	053	061	069	077	085	093	101	109	117
006	013	020	028	036	044	052	060	068	076	084	092	100	108	116
005	012	019	027	035	043	051	059	067	075	083	091	099	107	115
004	011	018	026	034	042	050	058	066	074	082	090	098	106	114
003	010	017	025	033	041	049	057	065	073	081	089	097	105	113
002	009	016	024	032	040	048	056	064	072	080	088	096	104	112
001	008	015	023	031	039	047	055	063	071	079	087	095	103	111

④ Test termination
Change the MODE switch position other than SRV position to terminate the test. The test termination message is printed.

101
Test termination print

CHAPTER 10. JOURNAL NEAR END SENSOR (DUNT-4945BHZZ)

1. Outline

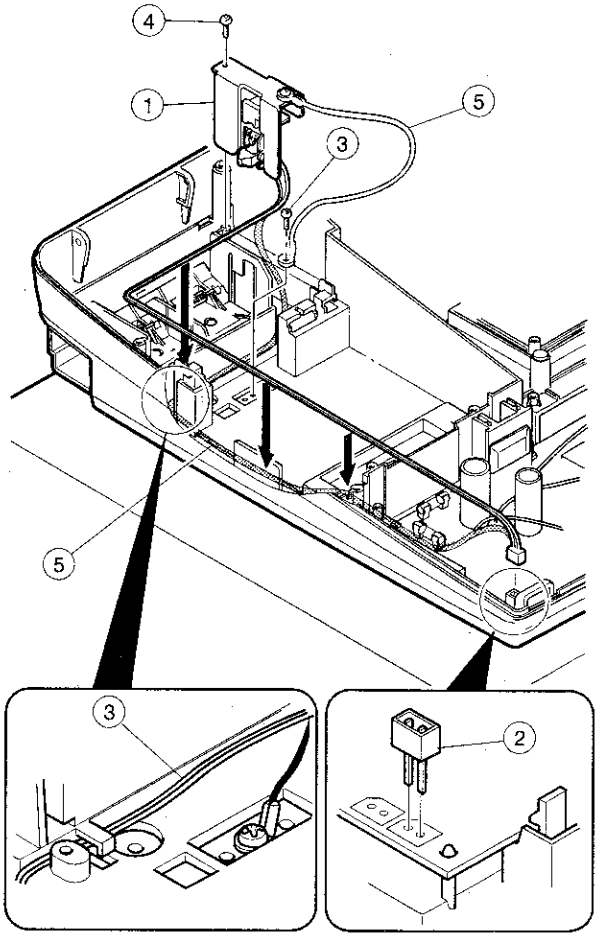
This option sensor is used to sense the journal paper near end.

2. Parts list

NO.	PARTS CODE	DESCRIPTION	Q'TY
1	—	Journal near end sensor unit	1
2	QCNCM6865RCOB	2-pin connector	1
3	XUBSD30P08000	Screw (For sensor unit)	1
4	XHBSD30P04000	Screw (For grounding wire)	1

3. Installation procedure

1) Remove the top cabinet.
2) Remove the printer unit.
3) Remove the main PWB.



4) Solder the 2-pin connector ② to Location No. CNB:NEJ on the main PWB.
5) Replace the main PWB.
6) Fix the sensor unit ① to the paper holder on the lower cabinet with the screw ④. (XUBSD30P08000)
7) Arrange the sensor cable ⑤ as shown in the figure and connect to the main PWB.
8) Attach the grounding wire ⑤ to the shield plate with the screw ③ (XHBSD30P04000)
9) Replace the printer unit and the top cabinet.

4. Operation test

Printer sensor test

① Key operation

106 → TL

② Details of test

Check the state of the paper near end sensor and the validation sensor.

DOT DISPLAY: S E N S O R S R V

7-SEGMENT DISPLAY: x x y y

③ Check item

x, x: Near end, receipt side, journal side
y, y: Validation, receipt side, journal side
C: Paper present
O: Paper empty
"C" is displayed also when there are no sensors.

④ Test end

Press any key to terminate the test. The end print is as follows:
106

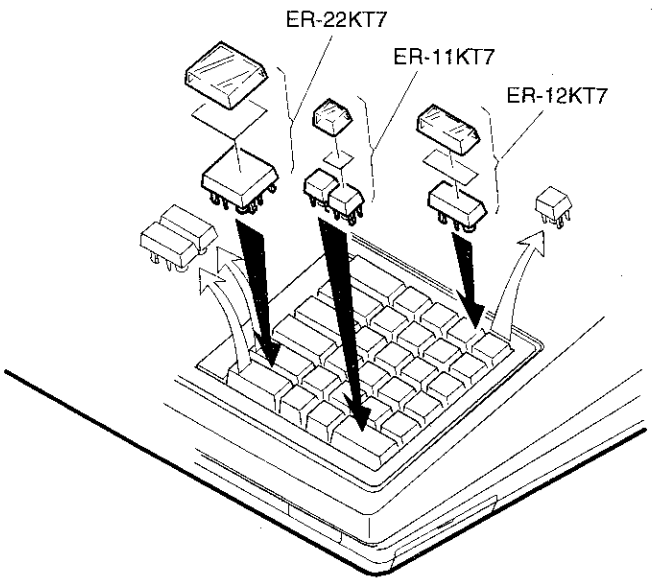
CHAPTER 11. KEY TOP KIT (FOR ER-A460 ONLY: ER-11KT7/ 12KT7/ 22KT7/ 11DK7/ 51DK7)

1. Outline

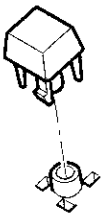
The ER-A460 employs the following key top (option) to allow additional installation of the key top and change in the key layout.

MODEL NAME	DESCRIPTION	Q'ty
ER-11KT7	1 × 1 Key top	30
ER-12KT7	1 × 2 Key top	30
ER-22KT7	2 × 2 Key top	10
ER-11DK7	1 × 1 Dummy key	30
ER-51DK7	5 × 1 Dummy key	10

2. Installation procedure

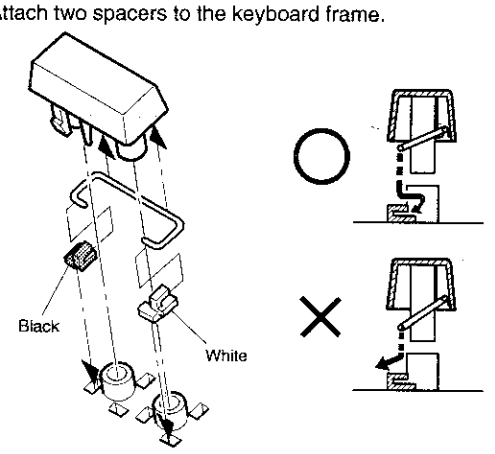


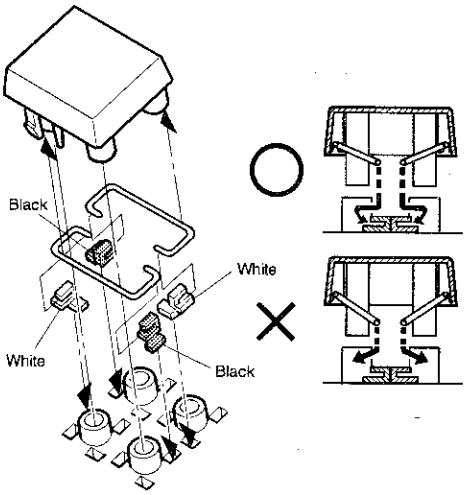
① ER-11KT7



② ER-12KT7, ER-22KT7

1) Attach two spacers to the keyboard frame.

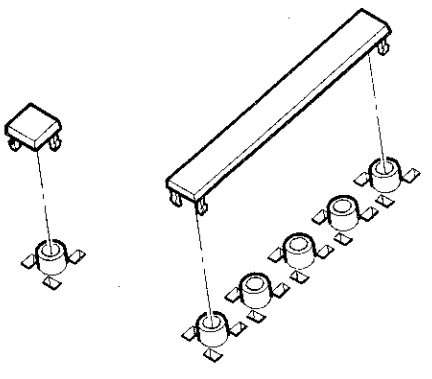




- Attach the black spacer to the left lower side, and the white spacer to the right lower side.

2) The key top of the ER-12KT7 and the ER-22KT7 includes the guide pin. Install the key top so that the guide pin is engaged with the spacer attached to the keyboard frame.

③ ER-11DK7, ER-51DK7



3. Operation test

1) Key, clerk, and switch position code display

① Key operation
101 → [TL]

DOT DISPLAY: CLK/ KEY SRV
7-SEGMENT DISPLAY: ○○○ – – ○○○ – –
Person-in-charge code
Key position code

② Functional description
Key, clerk, and receipt switch codes are displayed.

③ Check the following items:
Change key and switch positions for proper display activation.
Clerk code: 1 hole clerk key
000 (off state)
001 (Clerk 1)
002 (Clerk 2)
⋮
255 (Clerk 255)
Key code: --- (simultaneous two key) depression, invalid entry)

KEY POSITION CODE
ER-A460 (Normal key) 14 x 6

↑R	↑J	016	022	028	034	040	046	052	058	064	070	076	082
005	010	015	021	027	033	039	045	051	057	063	069	075	081
004	009	014	020	026	032	038	044	050	056	062	068	074	080
003	008	013	019	025	031	037	043	049	055	061	067	073	079
002	007	012	018	024	030	036	042	048	054	060	066	072	078
001	006	011	017	023	029	035	041	047	053	059	065	071	077

ER-A470 (Flat key) 15 x 8

↑R	↑J	022	030	038	046	054	062	070	078	086	094	102	110	118
007	014	021	029	037	045	053	061	069	077	085	093	101	109	117
006	013	020	028	036	044	052	060	068	076	084	092	100	108	116
005	012	019	027	035	043	051	059	067	075	083	091	099	107	115
004	011	018	026	034	042	050	058	066	074	082	090	098	106	114
003	010	017	025	033	041	049	057	065	073	081	089	097	105	113
002	009	016	024	032	040	048	056	064	072	080	088	096	104	112
001	008	015	023	031	039	047	055	063	071	079	087	095	103	111

2) Keyboard test

① Key operation
XXXX104 → [TL]
XXXX: Sumcheck data

Standard key layout sumcheck data	
ER-A460	3681
ER-A470	7449

② Details of test
Keyboard check is performed with the sum check data of key code.
For sum check data, data are inputted to the upper four digits before the diagnostics code. The data are compared with the added data which are added until the final key (TL) is pressed. If the data agree with the added data, the end print is made. If not, the error print is made.

The sum check data is obtained by totalizing all key hardware codes except for the TL key and converting the total into a decimal figure.

ER-A460 KEY HARDWARE CODE

1. STANDARD KEY LAYOUT
SUM CHECK DATA = 6F+65+63+00+02+ ····· = E98 = 3681

↑R	↑J	6F		65		63		00	02	08	0C	0E
7E	7F	77		74	73	71		10	12	16	18	0D
5E	7D	5F		55	54	53		50	52	56	59	2B
4E	5D	4F		45	44	43		42	46	48	39	0B
4D		2F		25	24	23		26	28	09		1B
3D		37			7B	78		3A	2A	2C	TL	

2. ALL KEY LAYOUT

↑R	↑J	6F	67	65	64	63	61	21	00	02	08	0C	0E
7E	7F	77	75	74	73	71	70	11	10	12	16	18	0D
5E	7D	5F	57	55	54	53	51	31	50	52	56	59	2B
4E	5D	4F	47	45	44	43	41	40	42	46	48	39	0B
4D	2D	2F	27	25	24	23	20	22	26	28	09	0A	1B
3D	3F	37	3E	1E	7B	78	79	1A	3A	2A	2C	1C	1D

ER-A470 KEY HARDWARE CODE

1. SUM CHECK DATA = 0F+06+05+04+00+····· = 1D0E = 7438

↑R	↑J	0F	06	05	04	00	01	07	0B	0A	09	08	0C	0D
4F	46	45	44	40	41	42	43	47	4B	4A	49	48	4C	4D
3F	36	35	34	30	31	32	33	37	3B	3A	39	38	3C	3D
2F	26	25	24	20	21	22	23	27	2B	2A	29	28	2C	2D
1F	16	15	14	10	11	12	13	17	1B	1A	19	18	1C	1D
5F	56	55	54	50	51	52	53	57	5B	5A	59	58	5C	5D
6F	66	65	64	60	61	62	63	67	6B	6A	69	68	6C	6D
7F	76	75	74	70	71	TL	73	77	7B	7A	79	78	7C	7D

2. ALL KEY LAYOUT

↑R	↑J	0F	06	05	04	00	01	07	0B	0A	09	08	0C	0D
4F	46	45	44	40	41	42	43	47	4B	4A	49	48	4C	4D
3F	36	35	34	30	31	32	33	37	3B	3A	39	38	3C	3D
2F	26	25	24	20	21	22	23	27	2B	2A	29	28	2C	2D
1F	16	15	14	10	11	12	13	17	1B	1A	19	18	1C	1D
5F	56	55	54	50	51	52	53	57	5B	5A	59	58	5C	5D
6F	66	65	64	60	61	62	63	67	6B	6A	69	68	6C	6D
7F	76	75	74	70	71	72	73	77	7B	7A	79	78	7C	7D

DOT DISPLAY: KEY TEST SRV
7-SEGMENT DISPLAY: ○○○
Key code

③ Check item

A) Check the display in the test and the content of end print.

④ Test end

Normal end	104
Error	E - - - 104